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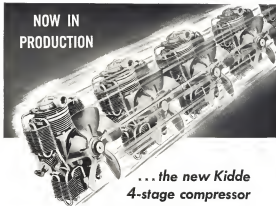
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NEWS DIGEST

DOMESTIC

Approval of Douglas DC-3A and B by CAA will be finished soon, says the Aircraft Safety Council's chief, George Hildeman. Problem of control under the wide center of gravity loading requested by both USAF and airlines is the main detail not yet settled by CAA. United Air Lines is testing its first DC-3B.

Insider info from and operations of eight airlines during negotiations between San Francisco and Los Angeles has been ordered by California's State Public Utilities Commission. PUC claims the carriers are charging higher fares (up to \$11.70) than it has earlier said (\$9.95 to \$9.00). CAA had approved rate to \$11.70 separately. PUC feels, since the rate is retroactive, its approval is also needed.

Placement heavily paid based on an increase in the contract price in air, has been going to the 72,000 hourly rated employees of United Aircraft Corp. The cost of living allowances adjustments made by UAW now eight cents an hour.

Mike O. "Rocky" Nelson, regional vice president of Frontier Airlines, died in Denver Mar. 4 of a heart attack. He was 46 years old. Nelson headed Airline Airways at the time of its merger with Northwest Air Lines and Coldinger Airlines to form Frontier Air line.

Newly established Services Division of Air Materiel Command has taken over full responsibilities for all USAF activities in the food field, ammunition safety, and phase services, laundry and dry cleaning, power regulation and maintenance work, and will handle its influence over AMC Wright Patterson photo server center. Many of these functions formerly were performed by Army but have been allocated to USAF under 1947 National Security Act.

Initial class of 135 aviation cadets has moved to restricted Graceland, AF, Mo., which is to operate under civilian contract, by Graham Aeronautics, Butler, Pa. Flying training will get underway Apr. 4. When peak training load at Graceland is reached, there will be about 135 civilian instructors, approx. 280 cadets and a total of 160 North American T-6s.

USAF's Douglas Super DC-3 has been redesignated YC-119. It previously was called the YC-119. Navy version is B-105.

Roosevelt Field, N. Y. tenants have renewed their aviation interest, including the end of the world's largest private airport, which with adjacent Canton Field was the scene of such aviation history, including Lindbergh's transit to Paris. The property has been so moved for industrial use.

Panda Helicopter Corp. has received Navy orders for a modified version of the HUP-1 helicopter. This makes company's backlog to around \$180 million.

C. S. Carey Jones, president of the Academy of Aeronautics, LaCombe Field, and World War I pilot and racing pilot of the 1910s has been elected president of the National Air Council. F. R. Berns of the U.S. Steel Corp. has been elected treasurer of the council and member of the board of directors.

Glen B. Bartholomew, former aviation manager at the Los Angeles chamber of commerce has been designated by National Aeronautics Assoc. as a vice president and assigned to a project of reactivating NAA membership, with primary emphasis on West Coast membership activity.

FINANCIAL

Mid-Continent Airlines reports a net profit of \$32,120 for Jan. 1951, after provision for income taxes, compared with \$5152 in Jan. 1950. Operating revenues were \$750,834 for Jan. 1951, \$123,575 over the same period the previous year. Passenger load factor was up to 56.11 percent.

Curtis Wright Corp. reports for year ending Dec. 31, 1950 profit of \$7,275,964 after taxes on sales of \$135,667,863.

INTERNATIONAL

F-66K Sub production by Canadair, Ltd., Montreal will soon reach 20 months, with output slated for a shipyard in 50 months.

ATAA Clearing House transactions during 1950 totaled \$147,632,000, a 10 percent rise over 1949, despite the turnover reduction represented by merger of ANA with PAA, and British South American Airways with BOAC. December's total was \$15,050,000, the second highest monthly turnover recorded since operations started in 1947.

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SIDELIGHTS

Congress

Chairman Bill Bradley will soon introduce a bill that would transfer GAO's consumer regulatory functions to Interstate & Foreign Commerce Committee. His staff is now drafting a report on domestic transportation, based on hearings held last year by a Senate subcommittee.

Abstract

[illegible]

Pseudo

Del Rosta's visit to Moscow to talk to top government officials there about a bilateral air agreement was as a personal representative of President Truman, the N. Y. Times says. Washington sources say Rosta's authority is high at the White House. Good has formerly headed

personnel director of American Airlines, a new spread assistant to the assistant to the president, Chicago department store.

Recently GRUBBS, CAL's public relations director, is recuperating at his sister's home in Atlanta after a heart attack. Chas. Conroy, former Republican Senator from North Dakota was confined by the Senate to CAL members to succeed Harold Jones, who died.

Here & There

Newest control subplot, a five-gro installation using Eclipse Pioneer equipment, has shown outstanding results in test runs at New's or experimental stations at Falls Church where used as a log skidder (Eclipse 200-40 in combination with the creek's by double control system). — Carl DeLeon

Alumnus/ine may not fit up a department even though it may not work out well as a mobilization with state organizations. This is a victory for NASA, which loved CDR, to drop its original plan to have its mobilization handled by an over-all transportation and

Fed Week's experimental apparatus plane has a spring that hops and spins back to it can watch from during the opening of the year at a moment's notice in flight. — CAS Aviation Safety new airplane engine loaders know how plane's limitations, use a skill warning device, know



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WHO'S WHERE

In the Front Office

Albert G. Buehlermeister has been named vice president of Lear, Inc. and given up his position as assistant to the president to become assistant general manager at the company's Grand Rapids plant. He joined Lear in 1946 after serving as chairman on several industry advisory committees during World War II.

W. E. "Tom" Stark has been made executive vice president and member of the board of United Aircraft Products, Inc., Dayton. Stark formerly was with Wright Aircraft for 11 years as project engineer on jet engine and turbine, and turbine control and accessory development.

Stephen R. Thowson, newly appointed deputy director general at the International Air Transport Association, has taken up his duties in the Montreal headquarters, following a two-month tour in Europe handling matters with the work of the IATA's traffic commission.

Changes

Paul Constant D. Fodan has been appointed chairman of aeronautical engineering at Princeton University, filling the vacancy created by appointment of Prof. Donald G. Styrer to the Princeton Research Center.

Charles L. Hall has been named technical representative in charge of Bell Aircraft's new Dayton office. E. W. Hall has been appointed personnel manager reporting directly to the general manager of the Fairchild Engine division. John A. Smith has been named assistant to the vice president of Continental Air Lines to handle flight safety and inspection matters. Fred C. E. Felt has been named to the same post as vice president, cargo sales manager.

John C. Bennett has been appointed to the newly created post of advertising manager for General International Aircraft. J. M. Klapp has been named to the new position of superintendent of government and commercial sales for United Air Line.

F. E. Wells has been made director of administrative procedures and N. E. Taylor has been appointed director of economic studies for Trans Canada Air Lines.

Honors and Elections

J. M. Larkin, a director of Cessna since 1951, has been made chairman of the executive committee of Cessna's board of directors.

Gen. Ralph Royce has been elected to the board of Boeing Aircraft Corp. Maj. Gen. Edward M. Powers (USAF) ret. was president and director of engineering at Curtiss-Wright, has been named to C-W's board.

William D. Strickland, vice president of engineering firm Doris Payson, Inc., has been elected to the advisory board. Edwin Schindler, president of U. S. Helicopters, Inc., Oakland, has been named president of the Civilian Helicopter Assn. for 1953.

INDUSTRY OBSERVER

►Canadian military sources say that the Avro CF-100 night fighter will outperform the surprising F-86 fighter at high altitudes.

►Delivery of the long-delayed Canair-Wright rocket motor for the Bell X-2 supersonic research plane is now due only this summer. The two combustion powerplants deliver about 15,000-lb thrust. With many test runs yet to be performed the test stand trials to date are considered satisfactory.

►CAA certification of the Allison T-38 turboprop is still a long way off. Allison expects to put enough time on its Turbofan to work out a lot of operational problems before it gets around to certification procedure.

►Long recommended transport safety practice of installing reserved seating areas to transport passenger cabin is getting a new boost: transportation from Great Britain. The United Kingdom delegation to an international conference of International Civil Aviation Organization in Montreal, is asking approval of a requirement that seats facing backward be installed in any transport carrying more than six passengers.

►Operation of two American helicopters, a Bell 47-D and a Hiller 360 in two Italian companies, for aviation photography, passenger logging and spraying for malaria control, have proved so profitable that the Italian operators, Aeritalia and Elic, are seeking additional customers. But they are running into operation problems due to large military orders held by the American manufacturers.

►The expensive Curtiss-Wright Turbofanjet propeller has recently run up to speeds in high in March 15 in a wind-tunnel test.

►The new Boeing C-97C Stratofreighter recently delivered to the USAF with a hooded-up fuselage and a cushion pressure cushioned parked with a few more modifications, will be the standard C-97 for Boeing's huge new production order for MATS. Flush-mounted antennas and new main landing gear identical with those used on the B-50 bomber are other features. Boeing's Flying Boats aerial refueling equipment is now designed for quick installation and removal on C-97s at any Air Force base.

►A modification of the Douglas C-124 loading gear to a four-wheel gear like that of the C-47 or B-36 may be forthcoming in response to Army criticism of the airplane's limited capabilities in operating in sand, forward area bases.

►Boeing has disclosed that one or the other of two forms of aerial refueling equipment are now standard equipment on its B-54 superfortresses in service use. Later B-50s are leaving the Seattle plant equipped with receiving equipment for the Flying Boats refueling system, while earlier B-50As and B-50Bs are equipped for the British flight refueling base and ref system. B-29 refueling tankers are designated KB-29P when they are equipped with the boom system, and KB-29M when they have the hose and reel.

►Lockbourne AFB, near Columbus, Ohio, soon to become a Strategic Air Command base, is getting a new 5000-lb. runway to accommodate B-36 and B-37 Air Force operations. But an Air Force spokesman has denied reports that Lockbourne would become SAC headquarters unless it Overly AFB at Omaha.

►Lookheed and the Union of South Africa are negotiating over purchase of eight Lockheed P-3V Lightning patrol bombers, the mission equipped with Wright Turbo-Propeller engines, to be used by the South African Air Force for coastal defense. In addition SAAF is receiving 10 new Vampires jet fighters now on order from de Havilland.

►Stanley Aviation Corp., Buffalo, N. Y., has developed an engine test bed for jet by booster engines on high speed jet bombers. The engine test will thrust the engines down through the heat of the engine plant. Company reports orders will equip Boeing B-47 and B-52 bombers with the engine tests.

Washington Roundup

Important People

• **Charles E. Wilson.** Politics give the Defense Mobilization chief six months more at the outside to stay in Washington.

He's tried to run Defense Mobilization like a business. It can't be done in Washington. Two major political factors have to be considered.

Labor's revolt is only the first open outbreak against the Wilson regime. Naturally, labor's lack in Wilson's failure to get labor cooperation on his contracts, and, to a lesser degree, to freeze wages. Actually, labor's biggest concern is that efficient businessmen Wilson will arbitrarily cut all civilian production for defense contracts, raising for some local unemployment. And, they're right about that—Wilson got his way.

Businessmen Wilson is not checking price defense contracts to a small Defense Plants Corp. for passing out to small businesses, when large corporations can efficiently, and at less cost fill the contracts. But congressmen, pressured by the powerful small business lobby, are determined that it's going to be that way. Up until Wilson's Small Business Committee, with \$100,000 to spend, as all on a series of local hearings to whip up small business' determination for protected-out price contracts.

And, businessmen Wilson's refusal to use syndicates in an essential defense industry and allocate all contracts needed for war weapon contracts has set the farm bloc against him.

Politics aid. Who, no matter how tight, can survive with the three most powerful political elements in the country—labor, small business, farmer—against him?

• **W. Stuart Symington.** This former Secretary of Air has gained his teeth and determined to stay on in the Washington scene, his friends say.

Some months back, Symington willingly surrendered a big bank of his jurisdiction to Chairman of the National Security Resources Board to Charles Wilson's Office of Defense Mobilization.

But days followed some developments Symington hadn't anticipated.

• NSRB's function of long-range mobilization planning were dropped by the White House's creation of a special board to do the job, under the chairmanship of Columbia Broadcasting System's president, William Paley.

• Symington's invitation to after dinner White House parties ceased.

• Last week, virtually the last vestige of NSRB general war mobilization functions known NSRB in the present new Undersecretary for Transportation, Delos Bristow.

Washington insiders ascribe the decline of Symington to the strategizing of John Stoenius, Presidential adviser Symington does not. The modern war "Police Captain" Stoenius calls him the "Police General" didn't like the Symington thrust to his power, Symington is not able, has done political friends, was on too good terms with the President (heaven, reportedly, General Stoenius no longer permit him to see).

French say Symington recently favored the situation involving him that Stoenius tried to put the screws on him, I know now, after lately we'll see whether he or I will win out.

Reconstruction Finance Corp.

Senators aren't going to write for the President's late endorsement of their plan to set up a single RFC guarantee to supply the present five-member RFC board.

They'll insist on other changes in the law. Two of them.

• All RFC applications for loans must be open to public inspection. This comes from the finding that two loans to Kaiser-Fraser Corp. of doubtful public interest were transacted in complete secrecy. According to the Fulbright Committee's unclassified records, Kaiser "played ball" with the Harley Hue Harvey-Gardner faction of RFC, dominated by Presidential adviser John Stoenius. After the Wilson administration's refusal to fund the loan, headed by Senator Donald Dewar, took the loan-making lead, Goodwin and Blue paid solid evidence for the Fulbright committee, were ousted from office by the President last November.

• CAR intervention in referee applications for loans must be ended. This stems from RFC's loan to North-west Airlines. Senators claim that RFC granted the loan for the purchase of Stinson without looking subsequently authorized and paid to Northwest to make good on the loan.

No More Plane Contracts Soon

It looks as though there will be no more plane contracts for many months, aside from two comparatively minor USAF contracts, one for a lightplane, and the other, probably, for a tactical plane.

Navy's Chief of Naval Operations said the funds to bid for aircraft and engine procurement by last December. It hasn't been given any new funds since.

USAF has now obligated 99 percent of its funds for aircraft and engine procurement.

An appropriations request for additional planes was supposed to go up to Congress last September of January. Didn't occur as it something three before and April, at the earliest. Contracts under it won't go out before July.

Navy's Air Carrier

Navy has long suffered from the effects of that old order of former Defense Secretary Louis Johnson canceling construction of its replacement, the proposed 65,000-ton United States.

But new Congress and the public are all in favor of a second major carrier—with emphasis on mobility, as well as size. It seems that the Navy, though, can't agree on one.

The anti-Navy fight is over whether the carrier is to have an "island" or not.

Vice Adm. John Canine, Deputy Chief of Naval Operations for Air, pointed out that deck, to place can take off in complete freedom, without clearance.

Vice Adm. D. B. Deane, Deputy Chief of Naval Operations for Operations, though, wants a small island, so the carrier commander can see where he's going.

The proposed compromise—a disappearing island, but could be lowered at short notice—never really solved the argument. Adm. Duncan claims it would be entirely too expensive. —Katherine Johnson

AVIATION WEEK

Aircraft Industry Steps Up Subcontracting

Manufacturers wary of over-expansion in face of higher taxes, uncertain future.

By William Kruger

The increasing share of prime contracts being passed out to subcontractors in the mobilization period may be a harbinger of slow but fundamental changes in the aircraft industry's normal way of doing business.

Up to now most of the pressure for greater subcontracting has been from the government for a reason quickly and easily understood, it lessened the government's heavy burden to meet normal defense needs.

But there are growing signs among the manufacturers that there may be other, more important reasons such to be moved by stepping up subcontracting. You see these signs when manufacturers like Curtiss-Wright Corp. and Lockheed Aircraft Corp. look with past traditions and go in heavily for subcontracting, because it now appears the better way to do business.

► **Why Subcontract?**—Reasons for the subcontracting policy of late and other manufacturers differ in detail. But the result is the same, a greater use of subcontractors that likely will become a permanent adjunct to the industry as time goes on.

In the case of Boeing, which is subcontracting up to 60 percent of its B-47 heavy bomber, the firm's biggest policy was decided in part to avoid artificially swelling Washington's population with consequent economic and social problems.

In the case of Curtiss-Wright, subcontracting (and its extension, licensing) is in part a concession from an unhappy policy of keeping everything at home in World War II, in part a permanent policy of new management, and in part a necessary measure to diversify C-W as to components of the subcontractors.

Lockheed's case has elements of most of the others. During World War II, the company subcontracted only 15 percent of its business. Now it is subcontracting about 40 percent of its work, even though President Robert E. Goetz in the annual report released last week says the step will cut out profits. The stark figures of subcontracting give part of the reasons for subcontracting

1958 sales were \$173,351,000, up from the \$117,647,000 of 1949, but 1959 profit after taxes was \$7,214,000, versus \$7,497,000 in 1949. In 1959, profit after taxes was 4.2 percent of sales, in 1949 it was 4.7 percent, in 1948, it was 5.3 percent.

The end of the years for greater subcontracting by big manufacturers is summed up by Lockheed President Robert Goetz like this:

"Aircraft manufacturers have had to learn the difficult lesson of how to expand and contract like an accordion with the defense needs of the nation and still go steadily forward. One of the difficulties that aircraft production organizations today is that we are neither in a position to program with freedom of action nor a weapons program calling for full mobilization. It is not one at the other but something in between. We are trying to achieve defense production in some fields continuously close to all-out mobilization levels without taking the steps necessary to assure it."

► **Twilight Zone**—Lockheed and other manufacturers trying to live in the mobilization twilight are increasing their own facilities—but only up to a certain point. Beyond that, they lean heavily on subcontracting.

Some manufacturers found out years ago that it is the smart way to keep a solid financial footing in peace and say Pratt & Whitney Aircraft, perhaps the most aircraft industry's pioneer in practicing subcontracting, was founded on a policy of subcontracting. This never keeping the home company smaller than it might have been. But it also meant less expansion and contraction as sales went up and down.

Lockheed's 1959 report refers again to the new policy. For the company expects sales to continue rising. But it is worried by the falling profit margin. Now it is expected to pay the rate lines. That leads inevitably to the question of where the post-war recovery means will come.

With \$4,562,500 budgeted for plant expansion in 1959, Lockheed probably will have facilities sufficient to meet normal future commitments, and greater subcontracting will handle demands above that and help avoid later

Past & Future

The most significant development in the industry's return to subcontracting is the likelihood that the leveling out of the work will become a permanent policy for most of the manufacturers, come war or peace. It is not as likely that, at the present level of mobilization, subcontracting will become as widespread as it was during World War II, for three principal reasons:

- **Price controls.** Of course, and not as large as during the war.
- **Licensing** of complete plants or engines is being used more now than during the war.
- **Large subcontractors** are subcontracting more now than during the war. This now means that the dollar value of subcontracts will be proportionately larger than during the war, but the total number of subcontracts may be smaller.

Here's how subcontracting grew during the past war:

- September, 1941, aircraft: 16 percent, engine: 20 percent
- December, 1942, aircraft: 29 percent, engine: 37 percent
- December, 1943, aircraft: 36 percent, engine: 35 percent
- December, 1944, aircraft: 38 percent, engine: 38 percent

The decline is again subcontracting against the reverse is financing of engines for manufacture. In aircraft, subcontracting rose in the wartime field. At one point, Republic was subcontracting 68 percent of the P-47. But that was late in 1944. Already, in the early stage of mobilization, Boeing is subcontracting about 60 percent of the B-47.

Subcontracting now of large subcontractors shows how necessary subcontracting is in World War II experience. A Harvard University study after the war was concluded that subcontracting at times was more a hindrance than a help because most of the parts were not set out well, requiring an elaborate checking system.

be cut back as defense production is stepped up.

The cut-back of civilian goods must be especially severe in the case of products made of metal. This is particularly true of goods that use scarce strategic metals such as aluminum and copper. Of our total defense production program, about half will go for "military hardware"—airplanes, guns, munitions, tanks and the machinery to make them. By the end of 1951 defense requirements are scheduled to absorb most of the metalworking production not required for essential construction and for the spare parts necessary to keep existing equipment running. For a time at least, there will be a sharp cut in the supply of new metal products available to civilian consumers. The defense agencies on both materials and manpower will also cut sharply into housing and other civilian construction.

For the Short Run—Controls

In the short run there is no answer to the problem of meeting defense production schedules except controls. Sharp reduction of non-defense expenditures by government is essential and would help greatly. But the basic fact is that we cannot increase our total production fast enough to meet immediately both civilian and defense requirements.

Controls are needed, therefore, to switch resources from civilian to defense production, and at the same time prevent the combined demand for critical products from sending prices right through the roof. In the case of many scarce strategic metals such as nickel, copper and cobalt, the task of increasing output is especially difficult because our limited supplies are tucked away deep in the earth in many quarters of the globe.

For the longer pull—and that is what we must face—there is another answer to our defense production problem that is infinitely better than controls. And this time, in contrast to World War II, it is all-important that we get the right answer to our defense production problem for the longer pull and that we get it right now. In World War II we gauged our economy to meet the requirements of a

relatively short and decisive conflict. Now our leaders, however they may differ as to methods, are well agreed that, at best, "the conditions under which we labor may persist for ten, fifteen or twenty years." That is General Bradley's phrase.

For the Long Pull—More and Better Production

For this longer pull, the constructive answer to our problem of defense production is clearly more and more efficient production all along the line. It is true that overall we now have the most efficient industrial establishment in the world. But, even so, much of it is far short of automobile efficiency. Some plants using up-to-date equipment and methods are as much as six times more efficient than others in the same industry that are lagging in modernization.

Our Director of Mobilization, Charles E. Wilson, has clearly in mind the problem of increasing our industrial efficiency. The first step in his job, as he conceives it, is to get out an adequate supply of weapons to equip the army, navy, and air forces already mobilized or in process of organization by us and our allies. The second step is to make sure of our capacity to produce both "military hardware" to meet any increased requirements and the maximum possible volume of goods for civilian use.

In concentrating on more and more efficient production, Mr. Wilson is squarely on the beam. We can obtain his objective—by sustained effort on the part of each one of us backed by up-to-date industrial methods and equipment.

If we do that, we can maintain indefinitely an adequate defense effort and at the same time enjoy a standard of living higher than any other in the world.

Additional production and more efficient production are our surest safeguards against our two most menacing enemies on the home front—the deadly inflation that can destroy our free economy, and the strangling government controls that can destroy our political freedom.

McGraw-Hill Publishing Company, Inc.

PRODUCTION



FORMAX DKK of Halford Smith Bros. with heating element in position at right, forms ...



ELEVATOR PARKING, seen after rough trim. Preheat time was 10 sec., heating time 15 min.

How to Stretch-Form Magnesium

Aircraft manufacturer shows how to apply and control heat; solves other problems in metal's fabrication.

A practical and efficient method of stretch-forming magnesium, developed by a major aircraft manufacturer, shows promise of eliminating the use of the material in place construction.

There is no fundamental difference between the forming of aluminum and magnesium except that the latter must be formed at elevated temperatures. And by carefully controlling the application of heat, magnesium readily can be formed, using the stretch-press technique already developed for aluminum.

Tool engineers at one of the country's foremost aircraft plants have, during recent months, solved the problem of how to apply and control the heat, as

well as using related problems, such as the selection of most suitable die materials and lubricants. The process, which is being patented, is reported to give highly satisfactory results consistently, even with part configurations that are difficult to form in aluminum, and is applicable to both annealed and hard-rolled magnesium sheet. Elongated perfect and forming time can be as low as two minutes.

Heat-control-thermal controlling factors are said to be the temperature (when preheated dies are used), and correct management of heating elements to give optimum heat distribution for each individual part configuration.

For example, heat must be taken to avoid overheating in engine forming areas, because the wall built in localized excessive elongation and rupture before the rest of the part is formed.

Heat is applied by means of heavy duty resistance-type, natural radiant heating rods. Temperature is regulated thermostatically, using thermocouple-type probes attached at strategic points around the edge of the material being formed. Temperatures must be checked and controlled separately at several points to maintain desired limits at all critical locations on the part to be formed.

► **Placement**—The heating unit is a straight resistance and placed at the local point of a curved highly polished reflector. As many of these units as required are placed side by side at a distance of about 5 in. from the material during the preheat period. Exact gap between heating rod and material for heat control depends on the nature of the part to be formed and may vary at different points along the same die.

Normally after the desired preheat temperature has been reached the heating unit can be rolled back, allowing the press operator full control of the forming operation. Parts as large as 48 x 144 in. may be formed at the point of development.

► **The Hold Heat**—The process has been used with both male and female dies, including cast employing systems. When Kirscht dies are used they must be protected to slightly below forming temperature to prevent too rapid cooling of the part.

Enough heat is absorbed by the die during preheating of the material to maintain its temperature within allowable limits for at least a half day of continuous operation.

Use of plastic in the material eliminates the need for die preheating. Subsequent point of the plastic now being used at 275 F. and experiments have shown that temperature of the die was five never approaches within 100 deg. of this point during the forming operation. About 4 in. inside the surface the plastic material stresses at room temperature.

► **Magnesium's Advantages**—Many parts are difficult to fabricate from aluminum because they approach or exceed the elongation limit of the material during forming. Such parts generally are given by bonded form magnesium when heated to the proper temperature, since the limit of elongation is approximately two to three times greater than with heat treatable aluminum alloys.

Another great benefit of magnesium for ease of fabrication is the total absence of quenching.

As most resistance is accumulated in the use of this process it is to be expected that wider use of magnesium in

4 things to look for when you need a new black-and-white print machine

NO EXHAUST DUCTS. Bruning BW machines do not use a vapor developer nor emit fumes, thus they need no exhaust ducts. You merely roll them on your tables in whatever they are needed, connect them to your electric current and they are ready to make prints.

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SHARON STAINLESS HAS WHAT IT TAKES FOR MODERN AIRCRAFT PRODUCTION

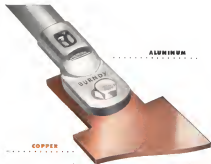


Where parts must be light in weight, yet absorb the heavy punishment of high speeds, high temperatures, and corrosive elements, they can be better made of Sharon Stainless Steel.

Aircraft manufacturers have fashioned hose clamps, shrouding bands, thermostats, baffles and many other parts from this versatile alloy, because Sharon Stainless has an extremely high strength-to-weight ratio, high heat resistance, low coefficient of expansion, high rust and corrosion resistance, and a constant uniformity unsurpassed in the industry.

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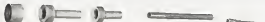


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AERONAUTICAL ENGINEERING



RELAT RECORDS BLADE in the four steps shown from left to right. Chipped steel inlet weighs 400 lb., the blade 200 lb.



WHITE-HOT RELAT goes into 1500 rpm press for blank formation.



Reheated (right) it goes back for blank expansion and taper.



BLADE TURNED out of press after third and final operation. First two metal too rough now takes minutes instead of hours. Finished blade (right) is turned in a lathe.



Prop Extrusion Is Production Milestone

Great savings will result from fabrication system developed by AMC with Curtiss-Wright and others.

By Irving Stone

Air Force industrial plantmen have teamed with private manufacturing enterprise to develop a new mass fabrication technique that makes a milestone in propeller production.

• The achievement: Hot extrusion of one piece, tapered, hollow steel propeller

blades for high-speed military and civil aircraft. Advantages include considerable savings in one of strategic chrome-nickel-molybdenum steel and reduced need for skilled labor, expensive tool time-consuming machining, and valuable floor space. And the stainless blade is stronger than its welded steel counterpart.

• The principle: Spokes of the program are the Air Materiel Command's Manufacturing Methods branch of the Industrial Planning division and the Propeller Laboratory of the Engineering division, teamed with the Propeller Division of Curtiss-Wright Corp. Co-operating with Curtiss-Wright in development of the process by solving such skills, data and tool were Hydrex Press Corp., Ford Motor Car Co., Naval Research Associates, Instrutronics, Nickel Co., Gearsy Molding

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Mig. Corp., Lincoln Steel Co. of America, Optum Furnace Co., Industrial City Blowing Co., and Oxy-Mig. Co.

• The equipment: The rough blade-mix is extruded on a 3500-ton horizontal Lowsy press at the Air Development Center, Adrian, Mich. During World War II, this piece of equipment, one of the largest of its kind anywhere, was used to extrude magnesium billets. Turning of the extruded blade is done at C.W.I. Caldwell, N.J., plant.

► **Start from Scratch**—The fabricating process was set up from a cold start about 15 months ago. No recorded data were available as the first extrusion of steel in the complex shapes and taper thickness required for pump blades.

Engineers trained with manufacturing and came up with a method for extruding the 4550 steel blade. Even at the stage of development, the method yields only 60 percent of the amount consumed for fabrication of the cast-particle welded steel unit. And as experience with the process is gained and more data accumulated, the figure reasonably will be cut.

► **Weight, Strength**—Also, more experience probably will show a way to effect weight saving. Since the process primarily was developed for manufacturing advantages, the weight factor has not been stressed and the present extruded unit weighs about the same as the equivalent welded blade.

But the extruded unit is stronger because the solid extruded and a more uniform metallographic structure is introduced with the extrusion process.

The extruded unit starts out as a 400-lb billet and ends up as a 200-lb

rough blade. The extrusion is pushed with the 750 lb of plate required for a welded blade of comparable weight. Thus, 750 lb of material in the extrusion process gives approximately two blades as against one for the same pondage with the welding technique.

The billet is preheated in a salt bath furnace prior to the first extrusion step. This salt bath heating gives setting for good heat treating and the salt prevents scale formation on the billet and lengthens die life by acting as a lubricant.

► **Three Simple Steps**—While hot from the salt bath, the billet is extruded in the press to give a semi-finished blank section, longer than that actually required, on the forward portion of the billet.

The Y-shaped piece is reheated for the second extrusion step, which tapers the blank by expanding the waste portion with standard and pressure from both ends.

In the third and final step in the extrusion process the extruded portion of the billet is extruded into a rough tube shape, with the already formed blank emerging first from the press. This operation takes less than 1 min. The tube portion of the rough blade is a tapered cylindrical section with "corn" or edges (which become the leading and trailing edges), moving from thick to tip at discontinuity of points points. Taper in the extrusion process is controlled by the relative positions of standard and die. Only about 0.15 in. of material is left on the tube for finishing.

► **Taper Data**—Thickness of the rough



SUBMERGED SPINNER

Popular spin jet mixing equipment at AeroProducts division of General Motors Corp. will be used for submersed high-speed rotation tests of new prop designs. Right-angle box box at top of shaft drive-mechanism at P.W.A. 4-1015 engine for test

prop below ground level. Propeller on engine motor is fixed, cooling fan and governor. Character can be evaluated to reduce aerodynamic loading on test prop, enabling high rotational speeds to be reached with little power expenditure.

...with elbow swivel nut
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Teamwork...



Once Again Pratt & Whitney Teams with Other Industries to Increase Aircraft Engine Production

★ IN WORLD WAR II, Pratt & Whitney Aircraft pioneered the system of licensing the automotive industry to help increase the output of its aircraft engines. So successful was this system that Pratt & Whitney, with its licensees, produced half the total horsepower used to power Allied combat aircraft during World War II.

IN THE PRESENT EMERGENCY, Pratt & Whitney Aircraft again is first to share its hard-earned engine knowledge in the common interests of national defense.

LAST SEPTEMBER, Pratt & Whitney licensed the Ford Motor Company to build the Wasp Major engine, currently in use on the B-36, B-50 and other long range Air Force and Navy Aircraft.

IN DECEMBER, the Chrysler Corporation was brought in as a licensee to build the J-48 Turbo-Wasp, which powers some of the fastest Air Force and Navy jet fighters.

BILL OTHER licensing arrangements are in the planning stage.

UNDER THESE LICENSING AGREEMENTS, Pratt & Whitney Aircraft—at no profit to itself—is already placing its own engineering and production experience at the disposal of Ford, Chrysler and others. They, in turn, will put their extensive manufacturing know-how to work on the task of increasing still further the expending production of these vitally-needed engines.

THIS is a typically American example of teamwork between industry and the Armed Forces in the common interest of the nation.

Pratt & Whitney Aircraft



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Castings



extruded tube at the blank end is about 0.25 in., tapering to approximately .099 at the tip.

Iron at the blank end are about 1.25 in. wide by 8.50 in. thick, running to about 0.75 by 0.50 in. at the tip section.

This dimensional relationship gives the approximately taper desired for the finished blade.

► **Final Forming**—The tube is hydraulically pressed of the Coldwell plant in two steps to produce the final shape. First, it is cold formed to give roughly an elliptical shape. Then, in another forming operation it goes into the blade configuration due to a high temperature.

Nitrogen at a pressure of 1100 psi is introduced when the blade is in the forming operation to force the material in close contact with the die.

Blade finishing operations are similar to those now used. Only major reworking is first performed on the blank.

The blade is essentially rectangular in planform, wider at the tip section. The tip is closed by welding or by a strip of injection-welded rubber. A rubber pin is run through the center of the blade for about 5.0' back from the tip in pursuit of cooling. Tip closure with rubber seems more promising than with welds.

► **Size, Made**—Length of blades that can be fabricated presently at Adams run to 94 ft. One, designed for Pratt & Whitney's R 4360 VDT engine, was fabricated in an 80 ft. length, the longest so far made by the extrusion process. The blade, extended to 9 ft., will be used on the P&W T-74 turboprop powered Douglas TC 124B.

C-W technicians say that they can extrude props for use of the General applications, except the one used on the B-75, which is wider than those that have been made with the new process. Press capacity is limited by a maximum extrusion rate that can be extruded.

A pilot production run is going through the Adams facility now. An other batch, right behind the run, will follow under an Air Force order and will be sized to be suitable for the B-50 and the C-124A.

A prototype article for the Navy will be fabricated later this year with two applications possible on a Convair sub-surface, surface plane and a Convair ASW blimp.

► **Commercial Use**—It would appear likely that C-W will push the extruded blade for service test in the very near future to further lure field of potential pump-compressor. However, Chambers are first the place will be Government and State-owned and that foreign operators also will be interested.

C-W will use the extruded blade for "Turboelectric" series in all three categories—marine, aerospace and



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PRESSURE RESISTANCE

Pressure of up to 300 p.s.i. can be accommodated.

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By changing the seal to suit each individual requirement, a wide range of temperatures can be accommodated.

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The flexible nature of the seal ensures a satisfactory joint regardless of a considerable degree of pipe misalignment.

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Subjected to a tensile load, under pressure, an extension of 40% was obtained without failure.

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The connector has remained leakproof after 500 hours of continuous vibration under test.

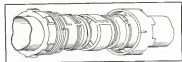
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The connector is lighter than comparable steel of base and pipe clip joints.

The FR Pipe Connector was designed to fit the need for a safe, reliable method of joining rigid pipes which meet uncommon high pressures. It is equally suitable for pipes of large diameters, as well as pressure reducing systems, but, by virtue of its low weight, flexibility and

simple application, whether the need for special seal design, it also finds a ready use in oil, condenser, hot air and other such applications.

A complete range of sizes is available for pipes from 1" to 41" O.D. Larger sizes will be made on request.



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Revised, tapered ends in male component receive lip of female. Panels are joined by force which causes them to lock together when they are joined by force which causes them to lock together.

Lightweight air transport ship, plus operation, with Roto-Lock fasteners, locks them quickly for easy future shipment.



Male component also shown in Roto-Lock fastener.

New Roto-Lock Fasteners Solve Demountable Panel Problems

Desires of any material—equipped with the new Simmons Roto-Lock—can be fastened quickly and securely either at right angles or butt joint. No skill is required—just turn the tapered ends to lock, then turn again to unlock. Check these features of Roto-Lock...

1. Roto-Lock exerts sufficient pressure to form airtight and watertight seal when gaskets are used between panels. Carries high-tension loads as well as heavy shear loads—providing a completely structural, insulated connection.
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3. With fasten in seriously misaligned conditions—locks in any stress-open position.
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Portable stations, air freight and cold-storage shipping containers, walk-in coolers, demountable fanatics, wind-folding, and many other designs where demountability is desirable, are using this valuable fastener. All see illustrated in our literature. Write for your copy today.



This portable shelter is made of honeycomb panels developed by the U. S. Plywood Corporation. All panels are secured with Simmons Roto-Lock Fasteners. Portable buildings are also being planned for other transport and maintenance because the lighter weight.

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QUICK-LOCK
SPRING-LOCK
ROTOR-LOCK

appliance—although small important blades probably will be sold and made by an appliance or food processing plant.

► **Flight Test Saw**—The extruded-blade saws aren't yet being flight-tested but tests are not far off. Test stand runs are now being made at C-W's Caldwell facilities and at Wright Field.

C-W has no plans for obtaining a senior size extrusion press for its Caldwell plant. Its schedule calls for continuing to extrude the single blade at Adams, then shipping it to Caldwell for being run into blade shape and finishing. The extra facility doesn't add much to the cost of the blade because most of C-W's new material is placed in the Midwest, fairly near Adams.

► **Production Factor**—If the company's volume of propeller orders remains about the same, a few less people will be required because the welding production will not be necessary.

With increased volume, at least the present military program, more blades can be turned out with the same plant personnel, whereas without the extruded blade process, the company would have to go outside its current facilities for additional productivity.

Plans are being made to switch from the welded type to the new extruded blade. Changover probably will be possible for ultimate replacement on sizes up to about 15 ft diameter in about two years. All extruded blade production now is for props in the 15 to 18 ft diameter class.

Application of the extrusion process is also feasible for fabrication of other aircraft components such as landing gear struts, helicopter main and rotor blade spars and drive shafts.

NACA Reports on Heat Transfer

A new contribution to the literature of heat transfer has been made by the National Advisory Committee for Aeronautics with the publication of Tech. Note 2284 (Turbulent Boundary Layer Temperature Recovery Factors in Two-Dimensional, Supersonic Flow, by Maxine Tucker and Stephen B. Miles, Lewis Flight Propulsion Lab).

Surface temperature calculations for a thermally insulating plate in the absence of radiation have been investigated several years for laminar boundary layer flow. For very low speeds, the temperature recovery factor was found to be a function of laminar Prandtl number only. Later work showed that this low-speed formula could also be applied to supersonic laminar boundary layer flow.

Earlier analyses for turbulent boundary layer flow are limited to the case of

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...and the world's toughest customers...

constant fluid properties. The method of analysis presented in TN 2276 is an extension of the particular analysis to the case of supersonic turbulent bound air-liner flow.

Assumptions—In their presentation, Tucker and Morley make use of a simplified model of the boundary layer flow for the turbulent case. The turbulent Prandtl number was assumed constant along any section of the boundary layer, and equal in value to the laminar Prandtl number at the surface. Viscosity profile was approximated by a power law. Pressure of the laminar sublayer was not considered except for the evaluation of the surface Prandtl number. Based on these conditions, the temperature recovery factor in turbulent flow was shown to decrease with increasing Mach number. For example, at a Mach number of 10, the recovery factor was about 5 percent lower than the freezing Mach value at zero.

Recovery factor also increased with an increase in Reynolds number, as in the low-speed case, but that effect was, in general, of secondary importance.

An approximate formula is presented for estimation of the recovery factor which represents computed results within 1 percent, according to the Tech Note.

Acro Slide Rule Developed at Douglas

Douglas Aircraft testing division technicians have developed a new slide rule for on-the-spot answers to common aerodynamic problems.

Revised in an aid for engineers and pilots, the rule covers conventional G, D, and A scales and 50 other computing arrangements permissive to combine.

With the 6 x 1 1/2 x 3/32 in. device, Douglas reports that it is possible to determine a plane's Mach number, time and indicated airspeed, density altitude, temperature rise and many other aerodynamic functions.

Performance may be calculated in miles per hour in knots without reference to conversion tables.

For quick conversions, there are scales for Centigrade-Fahrenheit and mph-knots relationships. Also, there are several relationships in the English and metric systems.

Report is that white surfaces have black, anodized sharp angles, cuttings are theoretically accurate to .0005 in., and that light metal case maintains accuracy in heat and cold.

Originally developed by Douglas A. Moller and his associates, the unit, known as Sky Rule, is being manufactured and sold by Pickett & Eckel, Inc., 55 Wabash Ave., Chicago, Ill. Price is \$12.85 for rule, includes pocket one and pocket-size instruction manual.

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Laminates

Fiberglass—plastic parts
have many ballistic and
dielectric uses.

By Robert Temple*

The principal interest in reinforced
plastics in the Bureau of Aeronautics is
in low pressure laminates, primarily
based on fiberglass/fiberglass, because of
superior strength/weight efficiency, low
pressure laminate with Fibreglass, only
mean physical properties are achieved
at relatively low pressure. In addition,
the low tooling cost for low pressure
laminates parts is attractive, particularly
where production runs may be relatively
small and the incidence of design modifi-
cations may be high.

► Naval Applications—Low pressure
laminates applications in Naval aircraft
fall into two main categories based on
physical properties at fabrication charac-
teristics of the material.

- Dielectric applications
- Lightly stressed, non-structural parts
- Bulkhead applications
- Parts of complex contour.

Dielectric applications include those
where dielectric properties are required,
and metallic materials cannot be con-
sidered—radomes, and other antisense
housing structures such as leading edge
sections of wings, stabilizers or fins.
Lightly stressed, non-structural parts
are those where high rigidity with mini-
mum weight is desired, such as in
hatches, doors, fairings, bulkheads, wing
tips and so forth.

Ballistic applications are those which
take advantage of the greater resistance
of low pressure laminates and impact
laminates. Fuel tank support structure
which probably accounted for the great
volume of low pressure laminates
used in Naval aircraft in the last war, is
an example of this type of application.
The plastic laminate provides a rigid
support structure for the self-sealing tank,
that will not spall or flake when
penetrated by a projectile.

Another type of application based on
the ballistic performance of low pres-
sure laminates is fire and fragment ar-
rest which is superior on a weight basis
to metallic armor. In this connection,
it appears that the structural laminates
should be considered for aircraft floor-
ing, as well as for housing for instru-
ments and equipment where fire re-
sistance may be viewed as an added
feature.

Parts of complex contour include

* Facilities and materials engineer, Navy
Bureau of Aeronautics. Former Director of
Aircraft Technical Drawing at Chicago of the
Bureau of the War Relocation Authority.

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(3) Heat-Treat Cycle Test to determine hardening and draw characteristics of work; (4) Thickness Tolerance Test to determine extreme tolerance requirements.

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these such as in ducts which are difficult to access, particularly in limited quantities, to lubricate loose metal. Parts in this category are those in which the selection of a low pressure lubricant is predicted largely upon the economy of the lubrication process and to a lesser extent upon the extensive engineering properties of the material.

Plastic Applications—Potential applications, some of which are under development, include battery cases, transmission boxes and chassis, auxiliary fuel tanks, rocket tubes, periscope drive containers, engine containers, camera cases, oxygen bottles, film magazine housing, backboards and equipment housings, and certain classified nuclear and missile applications.

Post-forming techniques are extensively used in a variety of lightly stressed applications, such as bearings and other shaped parts, where production economy may be achieved by post-forming techniques to produce rugged parts of complex shapes. Post-forming is used most extensively by the West Coast airplane manufacturers (one of whom developed the process). By the end of the last war, the aircraft requirements for post-forming stock amounted to a very substantial volume. It is anticipated that this will again be the case in the aircraft industry.

Some of the conventional high pressure laminate applications in aircraft are control pylons, fuselage spacers, blocks, structural beams, base plates for gunned controls, cases for expendable electronic devices, and other electrical and electronic parts.

There appears to be a trend away from the use of phenolic laminates for hydraulic parts such as pump valves, because of post-delamination with dimensional stability. Valvenoid has been used in very substantial quantities for locknuts which are employed in great quantities in engine assembly. However, it is probable that nylon will also be used extensively in this application.

In materials development we need laminates with greater strength at 500 deg. F and above and laminates that are ultrasonically resistant to high-speed non impact in static and dynamic loads.

Radet Projects—The Bureau of Aeronautics has material and development projects involving reinforced plastics with:

- General Ansonnet Laboratory—design and fabrication of a missile wing
- Goodrich Fiberglass Institute—development of heat-treated resins
- General Tumble Mills—design and fabrication of poly protective helmets
- Fibroc Research Corp.—disk armor in verification
- Northrup Battery and Eals—design

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PLASTICALLY formed on Lockheed P-51 (see figure). Nearly 9 feet long, the canopy is formed single piece of Plexiglas II. No. 100,000,000, General Aircraft Corp., Garden City, New York, and Plexiglas Corp., Philadelphia, Pa.



How Delta Speeds the Work

Mechanics at on-line stations help carry maintenance burden; it's good for morale as well as costs.

By George L. Christian

Atlanta—Pushing out of production jobs to on-line stations is proving a boon to Delta Air Lines. Maintenance costs are dropping, on-line employee morale rising.

The idea latched on as a result of the extra maintenance burden imposed on Delta shops when new B-747s were assigned. Who could absorb the additional workload? On-line station mechanics were the answer, but in business when trouble developed at that station, the men were idle for most of the flight, which go through without incident.

Let's No More—The carrier decided to put the idea into work. Being kept from the mechanics. Moreover, these efforts would alleviate the increased work load at the main overhaul base at Atlanta.

"To make certain that the men were thoroughly checked out on their duties, they were brought to Atlanta for instruction. Then the necessary equipment for the jobs to be performed was sent to the line stations."

"This is the way Delta allocated the work."

- **Spark plug overhaul**—Consists of about 180 plugs a day.
- **Control cable fitting**—New, Olden Station averages 70 cables a month.
- **Sent belt assembly**—Shoreport Overhaul is 100 belts a month.

- **Flex line construction**—Charlotte. Parts are shipped direct from station to store room in Atlanta when stock runs low.

Letter address in Birmingham which directed for parts to pass spare time, they will release engine at times.

Estimated yearly savings for the engine program \$34,000.

Management Speaks—In an interview, C. E. Woodman, the district

president, stated American Airlines that the structure of his organization was flexible enough to accommodate and that expansion should encompass new duties. He pointed with pride to the rapid and efficient manner in which Delta's overhaul program was set up. He predicted that Delta could do it again, only better, and with no disruption of his staff as he believes.

Woodman revealed that recent talks between himself and Lockheed Aircraft Corp. President Robert Gross and other Lockheed officials had resulted in an agreement that basically the same way would be maintained at the time to be constructed. Moreover, he stated that the existing aircraft job was of the type. This is no need of uncertainty. Duplication of labor supply plus Lockheed gets the huge installation into operation.



SPARK PLUG overhaul Dept. Consists of on-line mechanics buy, spend maintenance

H-Herb Boom—The new H-Herb boom project the government is building in the vicinity of Atlanta should be a boon to Delta's traffic, according to Woodman. With America's only 52 main by air from Atlanta, Delta's added traffic should further boost that city towards becoming one of the major air hubs centers of the South.

When asked what Delta's major problems were, C. E. Woodman, vice president-operations, replied: "An airline, man." This answer was indicative of the aggressive spirit throughout the airline.

Delta's goals of Delta's evolution of the Ridge Runner Flight Path Control, an instrument which automatically has the ILS glide path and location beam into the automatic pilot allowing the latter to fly the plane in the lowest instrument without any human assistance (Aviation Week July 17, 1990). He expressed satisfaction with the instrument and felt that it will and continuously in making completely automatic approach flights. But Delta said: Air ground installations are reliable enough at present.

New Look—The first Delta DC-3 is well along in acquiring the snappy new look to which the airline's entire fleet will be converted (Aviation Week Feb. 19).

Before undertaking the much-talked refurbishing, Delta conducted a survey of over 400 passengers who flew in a prototype conversion as it circulated over 10 stations. Of the passengers polled, 87 percent reacted favorably. Simple opinions:

Are Airline	944	54
Delta Flight	377	8
Two seats of seats in today	248	75
Don't resemble current	194	8
From regular seats	194	8
Worse or looking	103	0
Tell me if you like it	103	0
New upgrade seats	103	0
Delta new seat	103	0
Two seats of seats in today	103	0
Tell me if you like it	103	10

The prototype had 25 seats but the final conversion has only 26, to afford more cost-bargaining space.

A clever modification of the Air Star door mechanism of keeping the middle step and attaching the front with two D-ring fasteners. The opening provides a quick and easy means of opening the door without mechanisms. Door opening controls are simplicity itself. A small but one eye in forehead camera supplying fuel to an electric water-driven pump which used to activate a Globe Swift's landing gear. Previous has also been made for manual operation.

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F-89 System Mockups Aid AF

Northrop dropped and built system mockups will be used by USAF to indoctrinate ground personnel in the intricacies of the company's newest all-weather interceptor, the F-89 Scorpion. The "Flying Classroom" defines their graphics and acoustically the operation of armament, structural, test

erction, hydraulic fuel, landing gear, air conditioning and other systems. They will be flown from base to base for transition training of mechanics unfamiliar with the speedy ship.

Scorpions are being produced on undeveloped markets by Northrop for the USAF.

tion. The entire mechanism is installed in the bullet and adjacent to the door and is readily accessible for maintenance.

A modification of the DC-3 hydraulic system with the pump, strainer, valve, screened and two check valves installed allows both passages to feed the system simultaneously. Aircraft is automatically later landing gear system.

Wheels & Brakes—Here a new Delta gear is shown in line with wheels and brakes. It is starting immediately to install the "Wave Type" Goodrich wheel on DC-6s. Per number is 9148505. Current DC-6 replacement wheel will be mounted on DC-6s as

their wheels wear out. When the stock of DC-6 wheels runs out, the fix will also be equipped with the wave type, giving standardization between the two types of planes.

Brake shoes DC-6B (single disc Goodrich) breakers go on DC-6s. DC-6 single disc breakers go on DC-6s. DC-6 multiple disc breakers will be disposed of Super DC-3 breakers will go on improved DC-6s. Manufacturing idea is use of new, heavy type 1-in. brake discs on DC-6s until they are worn to the minimum limit of approximately 750 in. Discs will then be transferred to DC-4 breakers which use same size, only thicker. The discs may then wear down



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Shown above is a battery of creep testing machines used by Alcoa development engineers to measure aluminum alloy stretch under load at temperatures up to 600 F. It's only a small part of the specialized facilities which keep Alcoa technical information complete and up-to-date.

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pounds. They are available with standard AND mounting pads or with special mountings. Radio noise filters are optional. This new design has been explosion-proof tested according to USAF specifications.

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- to 594 before they must be removed from the buses.
- **How & There—G. J. Day, Delta's vice president of maintenance, made the following observations:**
 - **Flexibles II—Maintenance is negligible on DC-6 windows now that one is taken to keep cleaning fluids away from the panes.**
 - **Spark plugs—Champion R378 L plugs are used exclusively on all engines and are changed at 500 hr. Plugs are conditioned until they become unreliable.**
 - **Skidol—DC-6 cabin superchargers are being converted to use Skydrol fluid. The airline expects better service and reduced maintenance. Skydrol's synthetic selenium pump is used in the supercharger area to avoid constant reworking. Cost of \$25 per gal. prohibits use of this special pump in non-critical areas.**
 - **Valves—valves—Valves—hydraulic pump under test has been installed on all DC-4 and 6 models.**
 - **Unlabeled Forward—Black and white laminated Plexiglas placards with instructions clearly and legibly engraved through the outer black surface are in place on early worn and torn decals. One, placed in a prominent position in the cockpit of DC-4 coach planes, admonishes: "Watch your language, the passengers can hear what you say." Passengers sit close to the cockpit on coaches.**
 - **Instrument boxes—In the last month that instrument shipping bins were used to transport units from line to term to main base and vice versa, an instrument damage (percentage) 90 percent. Most of it in the ply wood sides top and bottom of the interior are lined with 1 in. foam rubber pads leaving a space in the middle just large enough for an instrument to fit snugly.**
 - **Tire & Brake—Two Edison Power electronic devices test and lock side wheels mounted on DC-4s have given excellent service since installation. The cars present no maintenance problems and have proved to be very accurate in diagnosis. Their overhaul period now is 2,500 hr.**
 - **MDI's—Delta's maintenance shop uses the Bendix Flange Master Dimension Indicator and transmitters to verify close tolerances. Result is that there are outstanding MDI with one transmitter, thereby eliminating accuracy of substituting a duplicate MDI to a given transmitter. Result is flexibility of component replacement and reduction in ground delays.**

That Delta is a leader, where it is desired by these companies: percentage figure, 1949 is 1950 increase in revenue passenger miles—18.3 percent, freight ton miles—42.7 percent, net profit after taxes jumped from \$639,440 to \$503,571.



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New Hartman 400-Ampere 28 Volt Converter for aircraft's weak busload systems (A 71510)

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HARRISON W. HOLGAPPEL,
Engineering Manager,
Western Air Lines

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New Landing and Taxi Light Pair

A new, two landing light twilight combination for small and medium size transport-type aircraft has just been announced.

The "Wing-Lite" are being marketed by Avision Accessories, Inc., P.O. Box 4178, Ft. Worth, Tex., who describes them as high in efficiency and low in cost and weight.

The \$37.50 kit consists of one GEC clear lens and beam landing light, with a 3-watt, continuous running filament; a diffused lens two all-purpose light, capable of long periods of illumination, two AN type toggle switches and two rubber mounting cushions. Lights require 18 amp at 12v, total weight is 28 oz.

The firm recommends that the landing light be mounted on the left wing leading edge beyond the propeller arc and the taxi light at an equivalent distance on the right wing. Standard wing practice should be followed, the wing being installed through wing to separate openings. The metal housings which fit over the leading edge of the wing may be fitted to almost any metal or fabric-covered wing found on light to medium weight planes. The manufacturer claims that flight tests conducted with an EA Lightning showed that there was no loss of speed due to installation of the light. The frontal area of the landing gear is negligible.

A single external adjustment has been provided to position the light pattern.

Western Gears "Open and Close Her Eyes"

Camera doors of the giant new Constellation RB-36 are operated by nine Western Gear actuators, of the type shown here. Thus, the photographic effectiveness of this reconnaissance bomber, which is reported to have the largest camera setup ever designed into one airplane, depends upon these small, precision gear units.



Small actuators, large gear units, or any type of ground product for ground or air-borne use—properly designed, manufactured, and tested—are available from Western Gear Works, backed by fifty years of gearmaking experience.

These camera-door actuators for the Constellation RB-36 incorporate a triple-reduction gear gear train with 96:1 ratio, provision for handcranking, torque-limiting clutch, and external adjustment of limit switches. Designed for operation in temperatures ranging from plus 160° F to minus 65° F.



For further information, or for copies of Actuator Bulletin 4811 or Actuator Engagement Bulletin 4801, write Western Gear Works, P. O. Box 159, Lynwood, Los Angeles County, California.

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made up of two representative cards, designed by the Secretaries of State, Treasury, Defense, Interior and Commerce, plus one card carried by the Defense Production Administration and the Defense Transport Administration. Reason for the DPA and DTA organizations are DPA has charge of transportation, equipment, production planning and production, DTA represents the Interstate Commerce Commission interests, mainly railroad and trucking business. Presently, the Commerce Department representative will represent concepts of air and overland.

Wait and See—Despite adverse appearance of an equitable industry balance as the committee, whenever any such depends on the representatives named by State, Treasury, Defense, Interior, Commerce and DPA. Also, when any later appear, some members to the committee.

Administration—The Office of Defense Mobilization is the top level coordinating policy and command office. The chair of committee is transportation mobilization, now, will be at follow: The new committee on defense transportation, headed by Federal, defense Wilson. Addressing the committee are mainly two transport groups that do the planning under—the Defense Transport Administration and the Commerce Transportation Office.

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Nonsked Role

CAB eases irregulars' regulations as carrier shortage looms.

The nonsked sector will soon start getting official military contracts to carry passengers and cargo. The Civil Aeronautics Board has given them authority to do this for a trial period of six months.

CAB regulation for civil airlines of these large irregular carriers will come eventually as outlined by the board last March in its proposed amendment to Part 261 of the Civil Air Economic Regulations.

Nonsked may make only three trips a week, irregular carriers will come eventually as outlined by the board last March in its proposed amendment to Part 261 of the Civil Air Economic Regulations.

Role of the Nonsked—in its new policy statement—"The role of the large military carrier—and supplemental shuttles, the CAB sets the nonsked industry at having two roles.

• "Innovation," that is, pioneering new routes and experimental services as at each end of air freight.

• "Supplemental service," by which CAB means service that the regular scheduled airlines do not give.

The CAB sets the presently irregular transport shortage in the means for generating the services to get efficient military business. Says the CAB policy statement, "There is every indication that the need for such services will increase, perhaps to a point where the combined efforts of certified and regular air carriers will not meet the demand."

The Board says that in a non-emergency period, the nonsked will take only on the transportation emergency basis. To this, the nonsked carrier that no large irregular carrier industry will exist on such basis, perhaps, then, from the main rules of the large irregular carrier listed by the Board—"innovation and supplementary service"—would be sales without planes.

• Military Business—The CAB says there are shortages of aircraft for purposes of moving military business. These are: Air Corps Transport Aircraft, 115th Bombardment, Washington, D. C., and Independent Military Air Transport, 115th Bombardment, Washington, D. C.

will deal with military traffic. The military traffic service is a business, carrying goods and passengers in a group. The MTX plan is due on hard-end test dates of last, it will observe how the nonsked fill its needs, and how the new system operates from day to day.

Meanwhile, the CAB states it will be ready to "pioneer" strict enforcement of economic and other regulations for the nonsked, to assure that the military is served only by safe and efficient carriers.

SAS Buying Trend Is to All-U. S. Fleet

Scandinavian Airline System apparently seems to believe that a U. S. jet-transport "bird" is the bird it wants now of anybody else's in the bank, including the much-needed De Havilland jet airplane. With 49 planes of its present 53-plane fleet, 49 of the U. S., SAS has committed itself to purchase five more Douglas DC-6Bs, to bring its total order for this type now to about 54.

And not for the dollar shortage, the Scandinavian airline company reportedly would go ahead with plans to replace its DC-3s now and its Scandians with 20 Convair Quairs.

The Swedish airline is at present in a poor negotiating position since its carrier is fully occupied as military work for the Swedish Air Force. Lack of a person acting as a tie to the U. S. is the present weakness against the Scandians.

Apparently, the only competition Douglas had was from another American firm—Lockheed. The Super Constellation was considered, but the DC-6B was not, probably on the basis of simplicity.



DOVE-EYE VIEW

De Havilland Dove's window visibility is a big asset point on this jet-transport short-hauler. Later buyers: Wayne Airways.

ing maintenance problems by keeping the number of types down to a minimum—SAS already operates a dozen DC-6s.

The planes, which will be 32-passenger versions with optional sleepers in the rear of the cabin, will be fitted with the standard Standard equipment.

Deliveries are scheduled to be taken during 1952. With space, the latest purchase will stand SAS approximately 57 million.

The newer model Douglas' DC-6B total sales to 53 planes—and for the entire DC-6 line, is 268.

Italian Carriers Report Rough Going

Heavier international airline competition is forcing two Italian airlines to the wall, the company says. Al-Flotte Aerea and Alitalia have given notice that they intend to make their own airlines, and reduce their costs. Local European, not American, lines are giving them most of their business.

AFL has stopped Milan-Paris and Milan-Rome operations, and has changed the daily Milan-Rome service to be weekly. AFL is controlled by Fiat.

Alitalia has stopped the Rome-Paris, Rome-Milan-London, and Rome-Capua-Milan-Tripoli routes. Then, Alitalia is operating only Rome-Capua, Rome-Pisa, Rome-Milan, and Rome-Rome. Alitalia is 49-percent Italian, held 51 percent Italian government-owned.

These companies, blaming foreign competition for their troubles, note that services of foreign airlines have now made Rome's Ciampino airport almost dead where in continental Europe.

The Federation of Workers of the Air is pressuring the Italian government to subsidize the airline again and to limit foreign competition.

American Adds Order For 3 More DC-6Bs

American Airlines is the first airline to announce it is jumping on the new equipment bandwagon. American has ordered three more 32-passenger DC-6Bs from Douglas Aircraft Co., bringing total American orders for this plane to 17. All will be delivered this year, at total cost of \$10,000,000.

Showing growth of an freight importance, American will use the DC-6Bs in regional routes. Seeking expansion on American's DC-6 line will be the airline as for the regular DC-6, although the plane is the last longer and has 1180 most horsepower. Second American

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30	176-120	1	176-120
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HARRISON RADIATOR DIV.

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STRICTLY PERSONAL

TIME FOR FUNDING?—The New Yorker Magazine quotes the late the Frimbythine legend: "The Air Force plant, beyond here from Santa Rosa, Cal., was making me understand in a very simple way the pilot called me out: 'Militarist that he had never been able to.' The New Yorker's comment is, 'Check the matter'."

FLYING'S SAFER THAN HAVING BABIES?—We have cobbed some pretty real water for you from Ben Lebow's Flight Safety Foundation Accident Prevention Bulletin. The fact that the Little Women speaks about just having a lot of us in the air, but that "The Journal of the American Medical Association," which is no longer than the fact that to insure the national aviation rate for the United States has been pushed slightly below the apparently insurmountable maximum of one maternal death per 1000 live births. "Wondershould" should indicate that their husbands have 180 more safe flights of carrying as well as safe than any time of carrying children: their 90,000 out of every 100,000 safe pregnancies were safely."

REPORT FROM OUR DENVER G-2 MAN—New Publisher, last postcard publicity was for Cincinnati Air Lines, we observed immediately purchasing its office from a "bad" department year in Cleveland, Ohio, according to Charles Adams, ex-Airline Writer, who's now in school at Berkeley, Cal. We also have some other news for Sunday morning going to check out with the various up for the Denver Post.

PROGRESS NOTE FROM HIS-ILY SHADIAN says confirms of us, would have changed some data as shown earlier. He was brought up that the other difference, involving two kids who taking. Mary had just returned from a visit to her grandmother in the country and in the kitchen she had seen a thumpy device that was lying in sight: "They call it an egg beater," Mary said. "It was just like a helicopter."

SCIENCE IS WONDERFUL—Don Van Flanagan goes on a list in something like to Clegg and Shadish. "The latest report of the Washington Project actually is: 'Final report, information the KATV FOR LEADERSHIP WATER.' And New Dealer over-coming CHAN Flight Aviation Service 'Monthly Comments on Aviation Trends' and found this post. 'That it (the PAS) said apparently in decreasing the hazards of interest flight and in supporting air safety, long concerned in one of the most dangerous to the public's expansion of private flying.' Says the Dealer: 'Yes, as, Air Safety is not only we're going to get it off.'"

MAYBE THEY WERE TESTING US—(Aviation Week's N.Y. office had an unexpected case on the phone last afternoon from someone who wanted service to know how away from the changes there are in a 5-18. We had a chance of a time looking out but we did. Then the fellow and we are calling for the Aluminum Company of America.

SUSPENSE WAS TERRIFIC—We've held this one in our files for too long. It was in an air freight ad published here and there by Delta Air Lines.

A talented, name named Alan. Who danced every night at the Tulsa. Books are real thing. But solved everything. With a tape she acknowledged. Press Dallas.

THE MOON GENERATION—Mel Torino, the head of Aerosol, Inc., at Longmont, Wash., already has his nose in modernizing the nation's better here among the young generation. His flying is a well known in the Longmont area, of course, in when a local author was going through the rubble road with his 5-year-old airplane the other day designed a low-altitude jet. The moderns now come to the airport. "What has four a back and four?" she asked. "Don't know the answer," "The Answer."

SIGNS OF THE TIMES—Sam Miers, the publisher, sends Delmar Van Flanagan the following clipping from a column in the Los Angeles Daily News. "Some time ago a gentleman at the GNA received a decision stating all mail bags had to be clearly labeled INCOMING and OUTGOING and placed in most postbags, but none from the Air Force, in the air, in the air, in the air. The shoddy nature of the decision and the implied recommendation against labeled his laws and in a gesture of pure protest he labeled everything on his desk—PENNY, PENNY, CALENDAR, etc. Now he finds, in amazement, that people around there think it quite natural that a pencil should be so labeled and an ordinary desk calendar called a calendar. Some of them, in fact, have commented on his different desk set up. As a result, he is still disturbed. He has that one of these days he may receive a new directive ordering everyone in the office to do the same."

WHAT'S NEW

Telling the Market

An eight page descriptive booklet on the Kofu Cosmos Propeller Model 2—used to retrofit dimensions, shape, and uses in production or tool making—detailing making and operation and includes a runway drawing. Given are some of the special jobs the propeller can handle. A price list which includes standard physical sales drawings, Fairbanks Kofu Co., Rochester 4, N. Y.

A G2-page ring-bound catalog, Taylor Laminated Plastics, covers laminated and phenolic films, and special laminates, design and manufacturing facts and Taylor Viter Co. engineering and research laboratory charts and tables of engineering data are included. Write the company at Norwalk, Pa.

Bolton Catalog CABLES covers Plasco below made by Chicago Metal Floor Corp. is a variety of uses and methods for applications in control devices and construction. Engineering data are included, as are links on attachment. Write the catalog at Maywood, Ill.

Easy to use charts for computing page pressure readings on hydraulic presses are available from Perkin Glass Co., Louisville, Ky. Separate charts have been prepared to cover presses with 1, 18, 12 and 14 in. dia pistons.

Individual bulletins on your production methods tell how your output has been increased, cost reduced, or quality improved in different plants. Available: Malsburg Tool Co., 7171 E. McNichols Rd., Detroit 32.

Designed to aid purchasing personnel in new locations, hand compiling technical data on Guardian aircraft controls, providing a source of current data as it is issued. Write Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill. A 20-page booklet containing the entire line of Deady die castings with complete physical and dimensional data is available from Deady Machine Specialties, Inc., 2108 So. Laramie Ave., Chicago 50. Bulletin ES-16 extensively treats use of industrial instruments in research including static, spectroscopic, constant rate, gas analysis, evaporation pyrometry, high vacuum gauges and force indicators. Write Industrial division, Massachusetts Instruments Register Co., Philadelphia 44.

Booklet contains pertinent data as well as with the following powder controlled by personnel in Baker & Davis molding powder department. Available by writing the Powder Department, Baker & Davis Co., Washington 26, S. Pa.

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AVIATION WEEK—MARCH 28, 1951

40	ALCOA CO. SPECIAL METALS UNIT	38	NORTH AMERICAN AVIATION, INC.
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100	ALCOA CO. SPECIAL METALS UNIT	98	PACKAGING CORPORATION

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THE Aerophysics & Atomic Energy Research Station at North American Aviation, Inc. offers unparalleled opportunities in Research, Development, Design and Test work in the fields of Low Speed Subsonic Flow, Aircraft Flight and Fire Control Equipment and Atomic Energy. Well-qualified engineers, designers and physicists equally needed for all phases of work in

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Security Break? A Case History

Newsmen have written what we hope is the last chapter in the story of "Scoop No. 1211J." This national news magazine with more than 800,000 circulation has told this last chapter securely.

It is not often that we can devote so much space to the background on any one story in *Aviation Week*. But this one, which involved espionage, needless criticism, and unfounded rumors, is worth going into.

Firstly, for the record, here is chronological order of important chapters in a case history of our controversial story that appeared in *Aviation Week*.

West Coast Speculation

Los Angeles Times' able, enterprising Marvin Miles, aviation writer, who on 1947 told *Aviation Week's* X-1 supersonic flight story off the news service wires and months later under his own byline, exposed suspicion in Los Angeles on Feb. 3 after this most recent revelation about a company in his own backyard. Said Miles:

Aviation Week's disclosure of the firm-engine autopsy revealing international leader (Model 1211J) proposed by Douglas gave rise to interesting speculation.

Was the leak made deliberately in the face of Air Force classification (possibly "Secret")?

Or was it a "planned release" planned by the Air Force for propaganda reasons?

Trade publications, with access a direct pipeline into most Washington circles, have a distinct advantage in gathering information on new developments, proposals, trends, etc. How much of the information they publish is aviation matter? None we hear from their rivals.

We wonder they go getting news but occasionally question the timeliness of publishing one item—often they're official plans—while we let the *Enquirer* with reports for dinner, only to be told "Classified dead—report cleared."

The AP Story

Washington, Feb. 3—An Air Force spokesman said today an inquiry is being made into publication in an aviation trade magazine of specifications for a possible new four-engine jet bomber of international range.

The spokesman told a reporter the "Air Force is making its own inquiry of the matter, which has been reported by the Inspector General as a possible violation of security."

He added, however, that "it is Air Force policy for the Inspector General to look into any report" that might concern security. He added that in this instance it is not known so far whether "there is or is not a violation."

The inquiry is based on an article appearing in the Jan. 29 issue of *Aviation Week*, which discusses reported criticism by Douglas Aircraft Co. for a new jet bomber. Officials of the magazine could not be reached immediately for comment.

The magazine states the proposed plane design is designated 1211J, would have a range: . . . etc.

From An Editorial Here Feb. 12

"If the Inspector General sends an investigator to us we shall be glad to tell him exactly how a sheet of a Douglas period brochure fell into our hands. The tale will reward you of the story recently about the Washington newspaper man who pointed up on the sheet a sheet of waste paper from NACA and found the contents worthy of printing."

What Does Time Mean By This?

Time magazine in its Feb. 26 issue rounded up a piece on bombers and said the latest to be revealed was the Douglas 1211J, designated "by *Aviation Week*, which sometimes sneaks the Air Force by describing airplanes that contain on the sheet but long after they are being talked about in West Coast bars."

The Newsmen's Story, March 12

To its competition, McGraw-Hill's *Aviation Week* magazine sometimes seems to be more the product of a den of spies than of a staff of highly competent reporters. Even the Air Force has had occasion to question the manner in which *Aviation Week* collects its frequent scraps on new aircraft.

(When, for instance, *Aviation Week* revealed that a plane had passed the speed of sound—*Newsmen*, June 12, 1946—a full-scale investigation proved that the magazine's reporters had done nothing more subtle than ask the proper questions in the right places and then print the answers.)

Last week, a perfect example of the magazine's "epicurean" operations came to light and, as usual, it boiled down to good reporting. The scrap involved was publication, in its issue of Jan. 28, of a sketch and a full set of specifications of Douglas Aircraft's 1211J four-engine bomber, a four-engine plane now in the drawing-board stage.

Even as newsmen picked up the story, some editors growled that *Aviation Week* must have got the news by violating security regulations. The Air Force promptly announced it would probe for the leak. *Aviation Week's* editor, Robert H. Wood, decided to save the trouble. Last Tuesday he sent Ben Lee, the writer who had got the 1211J story, message to ask to May Gen. Joseph F. Canine, Director of Special Investigations for the Air Force.

Lee's explanation was unconvincingly simple. While waiting in a public corridor of the Pentagon, near the Air Force's own public relations office, Lee had noticed a larger airplane picture taped to the front of a message box on one of the Pentagon's feet of intensive delivery bins. Curious, he peered the picture off. It turned out to be a crudely overlaid page of a Douglas brochure describing the 1211J in detail. Northern as it was, there was nothing of security in that. And, Lee concluded, if it was merely for display on the bulletin of a messenger's table, it was certainly not game for *Aviation Week*.

The only specifics not yet cleared up were (1) Was or wasn't the 1211J considered worthy of a classification? (2) If not, how did a messenger get hold of the picture? If it knew these answers, the Air Force would be better.

—Robert H. Wood



RIGHT for the Constellation.

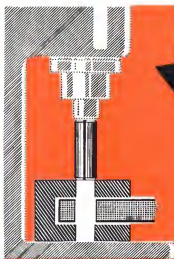
RIGHT for the Strategic Bombers

Constant check on fuel or state of engine performance — an essential in existing ground units for plane engines — is now being made for the U. S. Air Force's strategic bombers B-36 and B-50 by the Sperry Gyroscopic Analyzer.

Flight engineers aboard the bombers and commercial airliners such as the Constellation and the Stratocruiser find that the Gyroscopic Analyzer gives them levels and speeds in seconds through graph-like patterns on the scope — irregularities in power plant operation.

SPERRY GYROSCOPE COMPANY

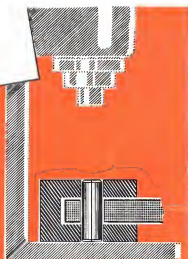
ROLLPINS... THE NEW IDEA IN FASTENERS



Rollpins are easily pressed into drilled hole—chamfered ends permit insertion by hydraulic or automatic hopper-fed press.



Rollpins compress as they are driven... are self-locking in production-drilled holes... eliminate reaming and peening.



Rollpins fit Rock, lock permanently in place. Constant spring tension against the walls of the hole fix Rollpins firmly in position.

How to eliminate rivets and set screws with Rollpin self-locking fasteners

Now put real fastener economy into your assembly procedure. With Rollpin metal fasteners as replacements you can eliminate many rivet and set screw applications and avoid the peening or threading operations which they require. One stroke of a press sets a Rollpin firmly in place, flush with the face of your assembly. This means real savings to you in costs and time.

It will pay you to investigate Rollpins for your product as a cost saving replacement for steel fastening pins, pivot or hinge pins, clevis pins, cotter keys, locating dowels, or shafts.

Rollpins exceed the shear strength of cold-rolled pins—they are easily adapted to jig assembly or automatic hopper-fed

presses. They provide a firm vibration-proof fit until deliberately removed with a pin punch... and since Rollpins do not enlarge the hole, the same pin can be re-inserted with a hammer!

For details on Rollpins, write to Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, New Jersey.



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Rollpin acts as guide shaft for spring-loaded relay contacts. Inexpensively and simply pressed in place... riveting operation eliminated... it outwears previous brass rivet by ten times.



Rollpins replace set screws for pinning pulleys to shafts. Hole tapping operation is avoided and Rollpin holds tight against vibration until deliberately removed.



Rollpins are supplied to specified lengths with chamfered ends. They are available from stock in a wide range of lengths in diameters from 5/64" to 1/2" in Carbon and Stainless Steels.